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The birds of Rottnest Island

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Abstract

The literature on the birds of Rottnest Island is reviewed and presented in a Table which lists the species of bird which have been seen on, around or over the island. Each species has been classed as resident (N=28), breeding migrant (N=6), non-breeding migrant (N=21) and vagrant (N=54) and listed under the habitats in which it has been recorded. In addition 4 species which formerly occurred on the island are also listed.

The importance of Rottnest Island as a conservation reserve is pointed out and the need for a long-term management plan for the island is stressed.

Introduction and literature review

In reviewing the literature, it is convenient to regard publications relating to the birds of Rottnest Island as coming from two periods: before the Biological Field Station was opened, and after. Before this event it was difficult for biologists to spend long periods on the island and publications reflect both this and the fact that ornithology in Australia was at the stage of producing inventories. Information on the birds appeared as: annotated species lists based on one visit (Lawson 1905, Kilpatrick 1932); annotated species lists based on more than one visit and incorporating observations of people other than the author (Alexander 1921, Glauert 1929, Serventy 1938, 1948); notes adding to existing birds lists (Conigrave 1909, Storr and Dunnet 1955, McCrum and Slater 1955, Storr 1957, Ford 1957, 1958); comments on breeding (Robinson 1935, Serventy 1947, Reid 1949, 1950, Serventy 1950). None provided detailed analyses of any of the birds, although Serventy (1950) gave an account of three breeding seasons of the Fairy Tern *Sterna nereis* based on a few visits each season (2 in 1947; 4 in 1949; 1 in 1950).

The early phase of the Field Station was reviewed by Hodgkin and Sheard (1959) and included a bird list for each habitat on the island (Serventy and Storr 1959). Since then the literature has been dominated by biologists operating from the Field Station, resulting in more detailed publications (Storr 1964a, 1964b, 1965a, 1965b, 1976; Holsworth 1965; Riggert 1969, 1977; Williams 1971, 1979; Williams and Main 1976, 1977). Notes which add to distribution lists are still published (Storr and Ford 1962, McMillan 1963, Smith and Saunders 1980), as are notes about breeding (Abbott 1977, Abbott *et al.* 1978), feeding (Farmer 1961) and longevity (Robin 1966).

Of these publications, Storr's papers (1964b, 1965a, 1965b) are the most comprehensive. Based on data collected during 275 days on the island from January 1953, together with previous literature and data from his colleagues, he presented detailed information on the status and habitat preferences of each species.

Since this work appeared there have been several studies of single species. Holsworth (1965) gathered data over three years on the breeding and juvenile dispersal of the Osprey *Pandion haliaetus*. During the period 1961-1963, three pairs bred each season, producing a total of 15 young of which 10 were banded. The three band returns showed that the immature birds disperse widely from the island.

Between October 1964 and December 1974 a study of the breeding biology and population dynamics of the Mountain Duck *Tadorna tadornoides* was carried out on the island (Riggert 1969, 1977). In addition, the possible effects on this population of shooting pressure on the mainland during the annual duck-hunting season was investigated. During the study 1690 ducks were banded, and of these, 1012 were marked with "A-frame" bill tags to enable individuals to be recognized from a distance. Counts of broods and of the population on the island were made at monthly intervals while band recoveries gave estimates of dispersal and mortality. Riggert found that

the Rottnest Island population forms part of the mainland population with migration to and from the island. Breeding numbers are limited by the number of brood territories, each of which must have fresh water available for the successful rearing of ducklings. Decreases in numbers during the year are related to dispersal of birds in summer caused by a reduction in the area of surface water and the number of fresh water seepages, as well as to dispersal in early winter of birds not successful in establishing brood territories. Population increases are due to recruitment in spring, as a result of breeding and to immigration in autumn of birds seeking brood territories. Riggert concluded that shooting on the mainland does not seriously affect the population of Mountain Duck on Rottnest Island.

The genus *Epthianura* (chats) consists of four Australian species which have been studied by Williams and Main (Williams 1971, 1979, Williams and Main 1976, 1977). They examined the physiological adaptations enabling chats to survive in arid conditions. The White-fronted Chat *E. albifrons* is the only species of this genus which occurs on Rottnest Island and Williams and Main (*op cit*) investigated seasonal movements, metabolism, evaporative water loss, tolerance to electrolytes in drinking water and water economy. Williams (1971, 1979) also examined the breeding biology, particularly timing of reproduction in relation to seasonal condition, nesting area and habitat with reference to availabiliy of fresh water and aspects of territoriality relevant to the maintenance of a water balance. On Rottnest Island, nesting was dependant upon winter rains with reduced nesting effort correlated with poor rainfall. Williams and Main (*op cit*) found that the conditions required for reproduction in each species are dependant upon their respective water balance physiology.

Rottnest Island and its adjacent islets, together with other islands round the south-west of Western Australia, have been used for examining theories on bird species diversity (Abbott, 1976, 1978, 1980). In addition to these studies, three general bird lists have been produced. The first, by O'Connor *et al.* (1977) is an account of the environment of Rottnest Island which includes a list of birds for each habitat. Information has been drawn mainly from the literature backed up by limited field observations made between 24 August and 16 December 1976. The second list was published by the Rottnest Island Board (Jenkins 1977) in a book on the natural features of the island but contains some inaccuracies and omissions. The most recent list was published by Saunders *et al.* (1981) which lists the birds together with information on breeding seasons, status and habitat. This was based on published information as well as personal observations of the compilers and was produced as a service to ornithologists visting the island.

The status of the birds of Rottnest Island

An account of the birds seen on, around or over Rottnest Island is given in Table 1 and is based on published literature. Each species is classed as resident, breeding migrant, non-breeding migrant or vagrant, and is listed under the habitats in which it has been seen. Literature citings are also given after each species, together with information on their abundance and breeding status, if given in the cited article. Between 19 December 1981 and 5 January 1983, a survey was conducted of the birds of the island based on visits at six-weekly intervals, during which 69 days were spent on the island. During each visit all species present on or around the salt lakes, swamps and sections of the coast were counted and the other habitats were surveyed. Those species seen during the course of the work, together with comments on their abundance are indicated in Table 1. We found evidence of breeding in 24 of the 28 resident species and 5 of the 6 breeding migrant species. In all, 71 species were seen: all of the resident species; 5 of the 6 species listed as breeding migrants; 17 of the 21 non-breeding migrants; and 21 of the 54 vagrants. Although the results of this surveys have not been analysed in detail, preliminary results make an interesting comparison with those published by Storr nearly 20 years ago. Our results indicate that at least 10 species appear to have a different occurrence from that listed by Storr (1964b, 1965a, 1965b). The Little Pied Cormorant *Phalacrocorax melanoleucos* was listed as an uncommon visitor to Thomson Bay, but is now found in small numbers around the island all year. The White-faced Heron *Ardea novachollandiae* was an uncommon but regular visitor, but last year was a vagrant (1 seen in April). The Black Swan *Cygnus atratus* had been seen once by 1961 but more recently small numbers have been seen regularly, mainly on Garden Lake. Black Duck *Anas superciliosa* now occur in small numbers on Salmon and Lighthouse Swamps during the summer whereas Storr *(op cit)* listed them as vagrants. During the period Storr was working on the island, these swamps were ephemeral, drying up in summer. Marl was extracted from these swamps in the early 1970s for use in road building. This resulted in permanent lakes (Edward, pers. comm.) which provide more suitable habitat for Black Ducks. Red-necked Avocets *Recurvirostra novaehollandiae*, now present in small numbers most of the year, were listed as rare visitors. Grey-tailed Tattlers *Tringa brevipes* and Bar-tailed Godwits *Limosa lapponica* appear now to be non-breeding migrants occurring in small numbers whereas Storr did not list the former and regarded the latter as a rare visitor. In the past, the Sacred Kingfisher *Halcyon sancta* was uncommon and of uncertain status, whereas now it is a common breeding resident particularly round the main settlement. The Rainbow Bee-eater *Merops ornatus* was not recorded on Rottnest Island until December 1977 (Abbott *et al.* 1978) and since then it has established itself as a breeding migrant. The Tree Martin *Cecropis nigricans*, formerly an uncommon visitor with a few birds visiting the island most summers, is now a common non-breeding migrant which can be seen in large groups all over the island.

More detailed analysis of our survey results may indicate other changes and reveal some of the reasons for the changes in status.

Discussion

As Seddon (1972) points out, Rottnest Island is an outstanding refuge, nesting ground and seasonal feeding ground for a great variety of birds because it offers a multiplicity of habitats. In all, 113

Table 1

Status of the birds of Rottnest Island and the habitats in which they may be found. Numbers after the specific name refer to articles in which that species is mentioned. The numbers are shown after each reference in the reference list at the end of the text and follow alphabetic order. Letters after a number indicates that the reference makes some comment about the species: either it's numerical status, C = common, U = uncommon, X = extinct; or some other point of interest, B = breeding noted, E = ecological study, F = feeding record, S = sight record, T = taxonomic record. The symbol * indicates that species was seen during the survey conducted by us over 69 days between 19 December 1981 and 5 January 1983. (± 3) after specific names of vagrant species indicates that species has been recorded as seen more than three times (+3) or less than three times (–3).

A. RESIDENT SPECIES (N=28)

HEATH

Nankeen Kestrel (*Falco cenchroides*) 6, 13, 16, 17U, 18U, 24C, 32UB, 35, 36, 37, 46CB, *UB.

Peafowl (*Pavo cristatus*) 16, 17C, 24U, 32UB, 35, 36, 37U, 46UB, *UB.

Ring-necked Pheasant (*Phasianus colchicus*) 10F, 16, 17C, 24C, 32CB, 35, 36, 37, 46CB, *C.

Banded Plover (*Vanellus tricolor*) 16, 24C, 32UB, 35, 37B, 45CB, *UB.

Spotted Turtledove (*Streptopelia chinensis*) 16, 24C, 32C, 34S, 35, 36, 37, 46C, *UB.

Laughing Turtledove (*Streptopelia senegalensis*) 16, 24C, 32C, 34S, 35, 36, 37, 46CB, *CB.

Welcome Swallow (*Hirundo neoxena*) 6CB, 13C, 16, 17CB, 18CB, 24CB, 32CB, 35, 36B, 37C, 46CB, *CB.

Richard's Pipit (*Anthus novaeseelaudiae*) 6, 13C, 16, 18CB, 24U, 32C, 35, 37, 46CB, *U.

Singing Honeyeater (*Lichenostomus virescens*) 6C, 13C, 16, 17CB, 18C, 22T, 24C, 32C, 35, 36, 37C, 46C, *CB.

White-fronted Chat (*Epthianura albifrons*) 6, 13C, 16, 17CB, 18U, 24C, 32CB, 35, 36B, 37, 46CB, 50E, 51E, 52E, 53E, *CB.

Silvereye (*Zosterops lateralis*) 2S, 6, 13C, 16, 17CB, 18C, 24C, 32CB, 35, 36C, 37C, 46CB, *CB.

Australian Raven (*Corvus coronoides*) 6C, 13C, 16, 17C, 18U, 24C, 32C, 35, 37, 46CB, *CB.

WOODLAND

Nankeen Kestrel. See under HEATH.

Peafowl. See under HEATH.

Ring-necked Pheasant. See under HEATH.

Spotted Turtledove. See under HEATH.

Laughing Turtledove. See under HEATH.

Sacred Kingfisher (*Halcyon sancta*) 16, 17U, 24C, 32U, 35, 37, 46UB, *CB.

Welcome Swallow. See under HEATH.

Red-capped Robin (*Petroica goodenovii*) 6CB, 13CB, 16, 17CB, 18CB, 24C, 32CB, 35C, 36, 37, 46CB, *CB.

Golden Whistler (*Pachycephala pectoralis*) 6, 13, 18C, 24C, 32U, 35, 36, 37, 46C, *CB.

Spotted Scrub Wren (*Sericornis maculatus*) 6, 13, 18U, 24U, 32U, 35, 36C, 37U, 46C, *UB.

Western Warbler (*Gerygone fusca*) 24C, 32U, 37, 46C, *CB.

Singing Honeyeater. See under HEATH.

Silvereye. See under HEATH.

Australian Raven. See under HEATH.

SALT LAKES/SWAMPS

Black Swan (*Cygnus atratus*) 16, 24, 32U, 45, *U.

Mountain Duck (*Tadorna tadornoides*) 6U, 13CB, 16, 17C, 24C, 28E, 29E, 31B, 32CB, 35B, 36B, 37B, 45CB, *CB.

Pied Oystercatcher (*Haematopus ostralegus*) 13, 17U, 24U, 32UB, 36, 37, 45UB, 47UB, *UB.

Red-capped Dotterel (*Charadrius ruficapillus*) 6CB, 13CB, 17B, 18CB, 24, 32CB, 36B, 37, 45CB, *CB.

Silver Gull (*Larus novaehollandiae*) 2B, 6C, 13C, 16, 17CB, 18C, 24CB, 26B, 32CB, 36CB, 37B, 44CB, 47CB, *CB.

Caspian Tern (*Hydroprogne caspia*) 17U, 24UB, 32UB, 37B, 44UB, 47UB, *UB.

Crested Tern (*Sterna bergii*) 2B, 6CB, 13C, 16, 17C, 18CB, 24CB, 26B, 30S, 32CB, 36CB, 37B, 44CB, 47CB, *CB.

Rock Parrot (*Neophema petrophila*) 6CB, 13CB, 16, 17C, 18CB, 24U, 32UB, 35, 36CB, 37B, 46UB, *UB.

Welcome Swallow. See under HEATH.

White-fronted Chat. See under HEATH.

Australian Raven. See under HEATH.

COAST

Pied Cormorant (*Phalacrocorax varius*) 2B, 6CB, 13, 16, 18CB, 24CB, 27B, 32CB, 37B, 44CB, 47C, *CB.

Reef Heron (*Egretta sacra*) 6U, 13UB, 24UB, 32U, 36U, 37, 44UB, 47UB, *U.

Mountain Duck. See under SALT LAKES/SWAMPS.

Osprey (*Pandion haliaetus*) 2B, 6UB, 13B, 15B, 16, 18UB, 24UB, 31B, 32UB, 36, 37B, 44UB, *UB.

Pied Oystercatcher. See under SALT LAKES/SWAMPS.

Red-capped Dotterel. See under SALT LAKE/SWAMPS.

Silver Gull. See under SALT LAKES/SWAMPS.

Caspian Trn. See under SALT LAKES/SWAMPS.

Crested Tern. See under SALT LAKES/SWAMPS.

Rock Parrot. See under SALT LAKES/SWAMPS.

Welcome Swallow. See under HEATH.

OCEAN

Silver Gull. See under SALT LAKES/SWAMPS.

Crested Tern. See under SALT LAKES/SWAMPS.

B. MIGRANT SPECIES WHICH BREED ON ROTTNEST (N=6).

HEATH

Rainbow Bee-eater (*Meerops ornatus* 5S, 24, 32, *UB.

WOODLAND

Fan-tailed Cuckoo (*Cuculus pyrrhophanus*) 6C, 13, 16, 24C, 32U, 35, 36, 37C, 46C, *UB.

Golden Bronze Cuckoo (*Chrysococcyx plagosus*) 13, 16, 24U, 32U, 35, 46U.

Rainbow Bee-eater. See under HEATH.

SALT LAKES/SWAMPS

Fairy Tern (*Sterna nereis*) 5B, 6CB, 13B, 17B, 18U, 24CB, 32CB, 36CB, 37B, 38B, 44CB, 47CB, *CB.

COAST

Wedge-tailed Shearwater (*Puffinus pacificus*) 2B, 6CB, 13CB, 16, 17B, 18UB, 24C, 32CB, 36B, 37B, 39B, 44CB, 47CB, *CB.

Bridled Tern (*Sterna anaethetus*) 2B, 6B, 13B, 17B, 24CB, 32UB, 36B, 37B, 44CB, 47CB, *CB.

Fairy Tern. See under SALT LAKES/SWAMPS.

OCEAN

Wedge-tailed Shearwater. See under BEACH.

Bridled Tern. See under BEACH.

C. MIGRANT SPECIES WHICH DO NOT BREED ON ROTTNEST (N=21)

HEATH

Tree Martin (*Cecropis nigricans*) 13, 24U, 32U, 35, 46U, *C.

WOODLAND

Tree Martin. See under HEATH.

SALT LAKES/SWAMPS

White-faced Heron (*Ardea novaehollandiae*) 13, 24, 32U, 35, 37C, 45U, *.

Grey Teal (*Anas gibberifrous*) 16, 24, 32U, 37U, 45U, *U.

Eastern Golden Plover (*Pluvialus dominica*) 6, 13, 24, 32U, 37U, 45U, *U.

Grey Plover (*Pluvialus squatarola*) 16, 24, 32U, 37, 45C, *U.

Hooded Dotterel (*Charadrius rubricollis*) 11S, 13, 18U, 24, 32U, 36, 37U, 45U.

Large-billed Dotterel (*Charadrius leschenaultii*) 24, 32U, 37U, 45U, *.

Banded Stilt (*Cladorhynchus leucocephalus*) 6C, 13, 16, 17, 18C, 24C, 32C, 35, 36, 37, 41, 45C, *C.

Ruddy Turnstone (*Arenaria interpres*) 6U, 13, 18U, 24C, 32C, 36C, 37C, 45C, *C.

Sharp-tailed Sandpiper (*Calidris acuminata*)13, 16, 17, 18C, 24, 32U, 36C, 37U, 45U, *.

Red-necked Stint (*Calidris ruficollis*) 6C, 13, 16, 18C, 24C, 32C, 37C, 45C, *C.

Curlew Sandpiper (*Calidris ferruginea*) 6C, 13C, 16, 18U, 24C, 32C, 37C, 45C, *C.

Sanderling (*Calidris alba*) 24U, 32U, 37U, 45U, *U.

Tree Martin. See under HEATH.

COAST

Grey Plover. See under SALT LAKES/SWAMPS.

Large-billed Dotterel. See under SALT LAKES/SWAMPS.

Ruddy Turnstone. See under SALT LAKES/SWAMPS.

Whimbrel (*Numenius phaeopus*) 9S, 11S, 24U, 32U, 37, 45U, *U.

Red-necked Stint. See under SALT LAKE/SWAMPS.

Sanderling. See SALT LAKES/SWAMPS.

OCEAN

Yellow-nosed Albatross (*Diomedea chlororhynchos*) 13, 24, 32C, 44C, 47, *.

Southern Giant Petrel (*Macronectes giganteus*) 13, 24, 32, 44, 47, *.

Cape Petrel (*Daption capense*) 24, 32U, 44, 47.

Wilson's Storm Petrel (*Oceanites oceanicus*) 24, 32U, 44.

Australian Gannet (*Morus serrator*) 24, 32U, 37, 42S, 44U, 47, *.

Great Skua (*Stercorarius skua*) 24, 32U, 44U.

Arctic Skua (*Stercorarius parasiticus*) 24, 32U, 37, 44U, *.

D. VAGRANT SPECIES (N=54)

HEATH

Black-shouldered Kite (*Elanus notatus*) (–3), *.

Brown Goshawk (*Accipiter fasciatus*) (–3), 24, 35, 46.

Brown Falcon (*Falco berigora*) (+3), 13, 18U, 24, 32U, 35, 46.

Australian Magpie Lark (*Grallina cyanoleuca*) (+3), 13, 24, 32, 35, 46.

WOODLAND

Brown Falcon. See under HEATH.

White-tailed Black Cockatoo (*Calptorhynchus latirostris*) (–3), 24, 35, 46.

Galah (*Cacatua roseicapilla*) (–3), 24, 46.

Purple-crowned Lorikeet (*Glossopsitta porphyrocephala*) (–3), 32.

Twenty-eight Parrot (*Barnardius zonarius*) (–3), 24, 46.

Pallid Cuckoo (*Cuculus pallidus*) (+3), 6, 13, 16, 17U, 18U, 24, 32, 35, 46, *.

Horsefield's Bronze Cuckoo (*Chrysococcyx basalis*) (–3), 24, 32, 46.

Boobook (*Ninox novaeseelandiae*) (–3), 13, 24, 32, 35, 46.

Black-faced Cuckoo Shrike (*Coracina novaehollandiae*) (+3), 13, 24, 32, 35, 46, *.

White-winged Triller (*Lalage sueurii*) (–3), 13, 24, 32, 35, 46, *.

Grey Fantail (*Rhipidura fuliginosa*) (–3), 24, 32, 46.

Willie Wagtail (*Rhipidura leucophrys*) (+3), 17U, 24, 32, 35, 36, 46, *.

Red Wattle bird (*Anthochaera carunculata*) (–3), 24, 32, 35, 46.

Striated Pardalote (*Pardalotus striatus*) (+3), 24, 46.

Australian Magpie (*Gymnorhina tibicen*) (+3), 16, 24, 35, 46, *.

SALT LAKES/SWAMPS

Australasian Little Grebe (*Tachybaptus novaehollandiae*) (–3), 13, 24, 32, 35, 45.

Hoary-headed Grebe (*Poliocephalus poliocephalus*) (+3), 13, 24, 32, 35, 45U, *

Darter (*Anhinga melanogaster*) (–3), 24, 32, 44.

Large Egret (*Egretta Alba*) (–3), *.

Little Bittern (*Ixobrychus minutus*) (–3), 24, 32, 45.

Straw-necked Ibis (*Threskiornis spinicollis*) (–3), 13, 24, 32, 35, 36, 45.

Black Duck (*Anas superciliosa*) (+3), 13, 16, 18U, 24, 32, 35, 45, *U.

White-eyed Duck (*Aytha australis*) (–3), 24, 32, 45.

Mongolian Dotterel (*Charadrius mongolus*) (–3), *.

Pied Stilt (*Himantopus himantopus*) (+3), 24, 32, 35, 45.

Red-necked Avocet (*Recurvirostra novaehollandiae*) (+3), 6, 13, 24U, 32, 45U, *U.

Grey-Tailed Tattler (*Tringa brevipes*) (+3), 32, *U.

Greenshank (*Tringa nebularia*) (–3), 16, 24, 32, 37U, 45U.

Common Sandpiper (*Tringa hypoleucos*) (+3), 16, 24, 32, 36C, 45U, *.

Terek Sandpiper (*Tringa terek*) (–3), *.

Knot (*Calidris canutus*) (–3), 16, *.

Northern Phalarope (*Phalaropus lobatus*) (–3), 32, 40S.

COAST

Little Pied Cormorant (*Phalacrocorax melanoleucos*) (+3), 24, 32, 44, 47, *U.

Black Cormorant (*Phalacrocorax carbo*) (–3), *.

Little Black Cormorant (*Phalacrocorax sulcirostris*) (–3), 24, 32, 44, 47.

Red-tailed Tropic Bird (*Phaethon rubricauda*) (+3), 24, 32UB, 36, 44UB, 47UB.

White-breasted Sea Eagle (*Haliaeetus leucogaster*) (–3), 24, 32, 44.

Sooty Oystercatcher (*Haematopus fuliginosus*) (+3), 6U, 11S, 13, 18U, 19S, 32U, 45U, 47.

Common Sandpiper. See under SALT LAKES/SWAMPS.

Bar-tailed Godwit (*Limosa lapponica*) (+3), 24, 32, 36, 45, *U.

White-winged Black Tern (*Chlidonias leucoptera*) (–3), 24, 32, 44.

Roseate Tern (*Sterna dougallii*) (–3), 24, 32, 44, 49S.

OCEAN

Little Penguin (*Eudyptula minor*) (+3), 24, 32, 44.

Rockhopper Penguin (*Eudyptes chrysocome*) (+3), 6, 7S, 11S, 13, 24, 32, 36, 44, 47.

Wandering Albatross (*Diomedea exulans*) (–3), 24, 32, 44.

Black-browed Albatross (*Diomedea melanophrys*) (–3), *.

Grey-headed Albatross (*Diomedea chrysostoma*) (–3), 24, 32, 44, 47, *.

White-headed Petrel (*Pterodroma lessonii*) (–3), 24, 44.

Antarctic Prion (*Pachyptila desolata*) (–3), 24, 44, 47.

Antarctic Fulmar (*Fulmarus glacialoides*) (–3), 20S, 24, 32, 44, 47.

Red-tailed Tropic Bird. See under BEACH.

Pacific Gull (*Larus pacificus*) (–3), 13, 24, 32, 44.

SKY

Fork-tailed Swift (*Apus pacificus*) (+3), 12S, 21S, 24, 32, 46, 48S, *.

E. MISCELLANEOUS SPECIES

Little Shearwater (*Puffinus assimilis*) Formerly bred, last recorded 1935. 24, 31B, 32, 36B, 44, 47.

Black-faced Cormorant (*Phalacrocorax fuscescens*) 17B. Mistaken identification of Pied Cormorant.

Whistling Kite (*Haliastur sphenurus*) 24, 35. Based on one doubtful record queried by 46.

Red-kneed Dotterel (*Charadrius cinctus*) 13, 24, but based on second hand report according to 45.

Domestic Pigeon (*Columba livia*) Introduced, now extinct 24X, 46X.

Brush Bronze Wing (*Phaps elegans*) Believed to have occurred. 13, 16X, 24X, 32X, 35X, 36X, 37X, 46X.

Rufous Whistler (*Pachycephala rufiventris*) Resident, now extinct. 6, 13, 18U, 24X, 32X, 35, 37X, 46X.

species of bird have been reliably recorded on, over or around the 1900 ha of Rottnest Island (Table 1). This is nearly twice as many as has been recorded from the 1100 ha of Garden Island (Abbott 1980, Davies 1980). It is not profitable to make a detailed analysis of the differences in the avifauna of the two islands because Garden Island has been poorly studied in comparison with Rottnest Island and the seemingly low species total for Garden Island may reflect lack of ornithological interest.

One conspicuous feature of Rottnest Island is the chain of salt lakes which occupy about 200 ha or 10.5% of the land area (Playford and Leech 1977). Rottnest Island is the only island in the south-west of Australia which is so endowed. Of the 55 species reguarly found on the island (resident and migrant species, Table 1), 25 (45%) may be found on this area. Of these species, 14 are migrants, the majority of which use the area as a refuge during the non-breeding season. Rottnest Island is an extremely important refuge in the south-west for several of these species. The Ruddy Turnstone *Arenaria interpres*, for example, breeds in the Northern Hemisphere and spends the non-breeding season in the Southern Hemisphere. The Royal Australasian Ornithologists Union Wader Study Group counted 487 Ruddy Turnstones in Western Australia during February 1982 (Mills 1982) and during the same period we counted 264 (54.2%) on Rottnest Island. Many of the species which feed around the salt lakes are trans-equatorial migrants which spend the Northern winter in the Southern Hemisphere. As a result, the largest numbers of birds are present on or around the lakes in the summer which concides with the largest human population. If the island is to remain a valuable conservation reserve as well as an important holiday resort, it is time to follow Seddon's (1972) advice of implementing a programme in environmental education coupled with a long-term management plan.

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The nutritional myopathy of the quokka as a model for research in muscular dystrophy

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Abstract

Muscular paralysis in the captive quokka was investigated because it seriously handicapped laboratory research. *Inter alia* the inherent ability of muscle to regenerate completely was conclusively demonstrated for the first time in this work.

Since then the regenerative capacity of muscle has been well established in many animals and in man. In all of these regeneration occurs in a well-defined sequence when the cause of myonecrosis is removed or corrected.

Principles of myopathology which govern the muscle lesions in those myopathies in which muscle fibre necrosis is the primary event have been formulated from these studies and are now widely accepted.

Field studies including vitamin E status at various times of the year and other biological observations are also described.

Introduction

The quokka *(Setonix brachyurus)* in its natural habitat is prone to a number of nutritional problems which are well-described in the literature (See Hodgkin and Sheard 1959). This deterioration is due to the long summer drought which, combined with a high reproduction rate and an absence of predators, causes the quokka population on Rottnest to be at the limit sustainable by the food supply.

One of the more dramatic effects of this poor nutritional state is the development of muscular paralysis. This myopathy is caused by vitamin E *(α-tocopherol)* deficiency. On Rottnest the myopathy is usually subclinical with the disorder becoming overt in captivity (Kakulas 1982). Quokkas maintained in cages on the mainland are subject to the effect of an "enclosure size factor" which aggravates the deficiency and which is remarkably specific (Kakulas 1963). Thus the vitamin E requirement of quokkas in small cages is much higher than that of animals housed in pens or larger enclosures. The basis of this phenomenon is at present unknown, but a similar effect has been observed in other conditions e.g. in dogs with vitamin D deficiency (Mellanby 1919).

Many of the biological aspects of the quokka myopathy are described in "Man Marsupials and Muscle" (Kakulas 1982). This work contains a scientific record of the investigation of the myopathy, an account of the pathology of the muscle disorder and its reproduction in the laboratory. The results of a field survey of the vitamin E status of quokkas on many parts of the island revealed high levels in winter and spring and very low levels toward the end of summer.

One of the most noteworthy features of these investigations was the observation of full regeneration of muscle leading to total restoration of architecture. This discovery was made in paralyzed quokkas which were treated with vitamin E (Kakulas 1961). The phenomenon of muscle regeration has relevance to many, as yet incurable human diseases, especially the progressive muscular dystrophies. The quokka studies have shown that full regeneration is a possibility, in the future, and thus serves as a powerful stimulus to further medical research.

Additionally by using the quokka myopathy as a model for the duplication and study of acute and chronic muscle disorders the principles which govern the reaction of muscle to injury have been greatly